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MARCH 11, 1950

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Top Young Scientists

See Page 163

A SCIENCE SERVICE PUBLICATION

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THE PRICE OF SUCCESS

What is it that brings one man success in life, and mediocrity of failure to his brother? It can't be mental capacity. There is not the difference in our mentalities that is indicated by the difference in performance.

The answer is, some men succeed because they cheerfully pay the price of success while others, though they claim ambition and a desire to succeed, are unwilling to pay that price.

THE PRICE OF SUCCESS IS—

To use all your courage to force yourself to concentrate on the problem in hand; to think of it deeply and constantly; to study it from all angles, and to plan ahead.

To have a high and sustained determination to achieve what you plan to accomplish, not only when conditions are favorable to its accomplishment, but in spite of all adverse circumstances which may arise.

To refuse to believe that there are any circumstances sufficiently strong to defeat you in the accomplishment of your purpose.

Hard? Of course. That's why so many men never reach for success, yield instead to the siren call of the rut and remain on the beaten paths that are for beaten men. Nothing of note has ever been achieved without constant endeavor, some pain and ceaseless application of the lash of ambition.

That's the price of success. Every man should ask himself: *Am I willing to endure the pain of this struggle for the rewards and the glory that go with achievement? Or shall I accept the uneasy and inadequate contentment that comes with mediocrity?*

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GENERAL SCIENCE

Top Two of Forty Winners

Measurer of helium atoms, Saul Sternberg of New York won the $2,800 award. Tennessean Donald McCormick, plant gall student, received the $2,000 scholarship.

See Front Cover

➤ A DARK-HAIRED, 16-year-old Bronx, New York, aspiring physicist, Saul Herbert Sternberg (at left), won the $2,800 Westinghouse grand science scholarship as the nation's top teen-age scientist in the ninth annual Science Talent Search. Saul, who lives at 245 East Gunhill Road, is a senior at the High School of Music and Art in Manhattan.

Second place in the nationwide competition for science-talented young people, carrying with it a $2,000 Westinghouse science scholarship, went to tall, 17-year-old Donald Bruce McCormick (at right), of 205 Outer Drive, Oak Ridge, Tenn., who plans to be a biochemist after graduation from the University of Tennessee. The two top scholarship winners are shown on this week's cover of the SCIENCE NEWS LETTER.

The awards were announced at the closing banquet of the Science Talent Institute at the Hotel Statler, at which Dr. J. Robert Oppenheimer, atomic scientist and director of the Institute for Advanced Study at Princeton, N. J., delivered the principal address.

Young Sternberg, whose father is principal of New York City Public School 611, is an inventor and student of biology in addition to his major interest in nuclear physics.

In preparation for entering the Science Talent Search, Saul undertook the very careful measurement of the tracks made by helium atoms across a photographic plate.

He calculated the energy released by cyclotron bombardment of this non-fissionable element. The helium was produced when the element boron was bombarded with neutrons. To get this effect Saul used photographic plates impregnated with boron, then persuaded Washington University in St. Louis to bombard them with neutrons in their cyclotron.

Saul has designed and built an electronic metronome, and is planning a new one which will signal the musician by tapping him. He also has made detailed plans for an electric page turner for music. Saul plays the violin and piano, and has organized a violin trio.

In the field of biology, the young scientist raised white rats to study their reaction to dietary and other changes, and has also done considerable dissection.

Donald McCormick, who ranks third in his class of 248 at the Oak Ridge High School, has been studying the abnormal growths, or galls, often found on goldenrod plants. He wanted to learn not only their causes and make-up, but was interested to learn whether, like oak galls, they would have any commercial value by reason of their tannic acid content. Because certain galls have been shown to be a definite type of plant cancer, Donald thinks that their study may lead to helpful knowledge in the conquest of cancer.

Donald has his own home lab, likes to work physics problems, and is interested in bird census work. Donald's father, J. A. McCormick, is a chemist.

First among the winners of the $400 scholarships, and named alternate to receive the $2,000 scholarship if the winner is unable to use it, is Malcolm Stephen Gordon, 16, of New Utrecht High School, Brooklyn, New York. He is on the staff of the school publication and stands sixth in his senior class of 600. His essay for the Science Talent Search, on a summer's survey of shallow-water fishes at Coney Island, already has been published in a magazine of the American Museum of Natural History and presented at the Museum's fifth annual high school congress. His studies at Coney Island, concentrated in the shallow waters around the 32nd St. jetty, involved almost daily seine hauls between June 25 and Sept. 9, 1948. His studies resulted in the description of a hitherto unknown function of a structure of small fresh-water fish.

Dr. Harlow Shapley, director of the Harvard College Observatory and chairman of the board of judges of the Science Talent Search, presented the scholarship awards.

The awards banquet was presided over by Watson Davis, director of Science Service, which conducts the Science Talent Search through Science Clubs of America. A. C. Monteith, chairman of the Westinghouse Educational Foundation which supports the Search, and vice president of the Westinghouse Electric Corporation, welcomed the winners and outlined the role of his company in the conduct of the Search.

The 40 trip winners were chosen by a panel of four judges after a nationwide competition in which top-ranking seniors in public, parochial and private schools throughout the United States participated. Entrants, representing all 48 states and the District of Columbia, totaled 13,585, of whom 2,245 completed the stiff science aptitude examination, submitted recommendations and scholarship records and wrote an essay on "My Scientific Project."

The scholarships may be used at any college, university or technical school of the winners' choice so that they may continue their training in science or engineering. Chosen for ability and aptitude, with no regard to geographic distribution, the 40 scholarship winners come from 15 states.

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GENERAL SCIENCE

Winners of Scholarships

GRAND SCHOLARSHIP OF $2,800

Sternberg, Saul Herbert, New York, N.Y.

$2,000 SCHOLARSHIP AND ALTERNATE

McCormick, Donald Bruce, Oak Ridge, Tenn.

ALTERNATE FOR $2,000

Gordon, Malcolm Stephen, Brooklyn, N.Y.

SCHOLARSHIPS OF $400

Detenbeck, Robert Warren, Kenmore, N.Y.
Gordon, Malcolm Stephen, Brooklyn, N.Y.
Gunter, William Dayle, Jr., Bellingham, Wash.
Malone, Dennis Philip, Kenmore, N.Y.
Reeves, William John, Jr., Springfield, Oreg.
Taylor, Lenore Yvonne, Utica, N.Y.
Tifft, William Grant, Seymour, Conn.
Wyeth, Cynthia Walton, Philadelphia, Pa.

ALTERNATES

1st alt. Jackson, Patricia Alice, New York, N.Y.
2nd alt. Jackson, Cynthia Betty, New York, N.Y.
3rd alt. Wawszkiewicz, Edward John, Woonsocket, R.I.

SCHOLARSHIPS OF $100

Beaver, William Thomas, Albany, N.Y.
Cohen, Paul J., New York, N.Y.
Elliott, Noel Penney, Kellogg, Idaho
Feinberg, Gerald, New York, N.Y.
Finegan, Joel Dean, Gary, Ind.
Franchere, Julie Victoire, Portland, Oreg.
Fuchs, Ronald, Pasadena, Calif.
Glashow, Sheldon Lee, New York, N.Y.
Korenman, Stanley George, Brooklyn, N.Y.
Krongelb, Sol, Jersey City, N.J.
Jackson, Cynthia Betty, New York, N.Y.
Jackson, Patricia Alice, New York, N.Y.
Lubell, David, Brooklyn, N.Y.
Lubkin, Elihu, New York, N.Y.
Markhoff, Nicholas George, Huntington, N.Y.
Martin, Donn Robert, Cincinnati, Ohio
McKinney, Alice, Phoenix, Ariz.
McPortland, Winifred, Dorchester, Mass.
Piskule, Donald Frank, Kimball, S. Dak.
Posner, Edward Charles, New York, N.Y.
Rippon, John Willard, Sylvania, Ohio
Rosen, Victor Joseph, Jr., Beverly Hills, Calif.
Rosler, Lawrence, Brooklyn, N.Y.
Siegel, Jerome, Brooklyn, N.Y.
Steiner, Lisa Amelia, Forest Hills, N.Y.
Sussman, Alan, New York, N.Y.
Warren, Alice Janet, Ithaca, N.Y.
Wasserman, Edel, Brooklyn, N.Y.
Wawszkiewicz, Edward John, Woonsocket, R.I.
Zeidenberg, Phillip, Brooklyn, N.Y.

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NUCLEAR PHYSICS

Asks Halt in Weapon Work

➤ AN AMERICAN physicist, who worked at Oak Ridge, Tenn., on the A-bomb during the war, has called upon all scientists to stop new theoretical work which would result in new weapons in the future.

Now Fullbright Exchange Professor at the University of Edinburgh, Dr. Edward M. Corson, Chicago, declared in a letter in PHYSICS TODAY (March), the publication of the American Institute of Physics, that the scientists, "obviously cannot now restrain, by our convictions, the use of known weapons; this is part of history, and now merely nuclear technology. But there are far worse (theoretical) possibilities which, if ever realized, might well rend our planet."

Dr. Corson called upon scientists the world over to use their knowledge and the imminent presence of these new weapons to call a halt. "Use that very fear and ignorance of mean men to a true purpose," he demanded.

Dr. Corson was motivated by the revelations of the Klaus Fuchs case. He stated that he had known and worked with Fuchs on the A-bomb, that he couldn't believe that Fuchs was guilty when the news first broke, but that now he considers Fuchs a psychotic personality of the kind who "seek mastery over men."

"The one entity," said Dr. Corson, "which nations can neither buy nor build, command nor usurp, is intellect, on which will depend such things as more efficient and horrible bombs as well as the better purpose to which this knowledge can be put."

Admitting that the task he set before the scientists of the world is not simple, he also said that he did not know whether there are among Russian scientists enough men of deep conviction akin to a Christian ethic, for theirs will be the most difficult task of all.

"Yet," he declared, "I call on all scientists, of all creeds and nations, to stop new theoretical work on this monster now."

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MEDICINE

Glandular Fever Overcome

➤ ADD glandular fever to the list of diseases that are being overcome by aureomycin, the golden yellow mold drug that ranks with penicillin, streptomycin and chloromycetin as top wonder drugs of the year.

In most patients with glandular fever, symptoms disappeared completely within 48 hours, and in some cases symptoms were gone as soon as six hours after aureomycin treatment is started, Drs. Harold A. Lyons and Edward M. Hard, of the U. S. Naval Hospital, St. Albans, L. I., N. Y., found.

At the same time, the temperature returned to normal. And the weakness that follows the acute stage of this disease was considerably less in patients who received aureomycin. Patients averaged 26 days in the hospital with aureomycin treatment, compared to 39 days on other forms of treatment.

These results, from a study of aureomycin treatment in 18 patients compared with 25 patients on bedrest and treatment of symptoms only, were reported by the Navy doctors to the New York Academy of Medicine.

Glandular fever, known medically as infectious mononucleosis, is an infectious disease of unknown cause. Swollen glands, fever, and sore throat are among the symptoms. The disease is most common in children and young adults, and may occur in epidemics as well as sporadically.

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Question Box

GENERAL SCIENCE

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What can politics learn from science? p. 170.

What was the main objective in the visit of the Japanese scientists to the U. S.? p. 169.

Who are some of the top scientists opposing the tight security regulations in the science bill? p. 166.

Photographs: p. 176, U. S. Air Force.

NUCLEAR PHYSICS

Who is the American physicist who has asked a halt on all weapons work? p. 164.

ZOOLOGY

What is the clue to the solution of the insect vision problem? p. 164.

What is the method of travel particular to spiders? p. 174.

INSTITUTE HIGHLIGHTS—Left to right: Congratulations for the top two from J. Robert Oppenheimer, A. C. Monteith, Watson Davis and Harlow Shapley. Dr. Karl Lark-Horovitz explains the physics of the solid state. Winners question Dr. Earl J. McGrath on "Adventures in Science." Dr. Wolf Karo tells of jet fuel work. $2,000 alternate, Malcolm Gordon. $400 winners: Leonore Y. Taylor, Cynthia W. Wyeth, Robert W. Detenbeck, William D. Gunter, Jr., Dennis P. Malone, William J. Reeves, Jr. and William G. Tifft.

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GENERAL SCIENCE

Protest Tight Regulations

Top scientists have gone on record as opposed to the tough security regulations included in the National Science Foundation Bill.

➤ THE nation's top scientists have officially protested the inclusion of precedent-breaking tough security regulations in the bill setting up the National Science Foundation.

President Alfred N. Richards of the Council of the National Academy of Sciences declared that persons who may receive scholarships under the act on the basis of character, loyalty and competence can be selected "without resort to the F. B. I."

The Council's opposition to the security restrictions was contained in a letter to President Truman over Dr. Richard's signature and a statement of principles by the Council.

An amendment voted into the Science Foundation bill by the House of Representatives would provide that employees and persons receiving scholarships from the Foundation be investigated by the F. B. I. and that the F. B. I. pass judgment as to their loyalty. Heretofore, the F. B. I. has never been directed—and never wanted—to act in a judging capacity.

"Investigation by F. B. I.," said Dr. Richards, "of large numbers of young persons who are not suspect is not only unnecessary but may be positively detrimental to the objectives of the bill."

The National Science Foundation would pay for basic research, mainly in non-military fields, and also provide scholarships to train young scientists.

Dr. Richards' letter pointed to the decision of the National Academy of Sciences last year not to administer the Atomic Energy Commission fellowship program when loyalty provisions were attached to the program by Congress. Although the Council did not take up the issue, it is believed that many of the nation's top scientists would refuse to serve on the Science Foundation's board if the F. B. I. amendment should remain in the final bill.

Speaking of the F. B. I., Dr. Richards' letter said: "Faulty evidence or unfounded opinions which might be contained in an F. B. I. report might lead to adverse decisions which could be irretrievably damaging to innocent persons.

"There is ground for apprehension that the imposition of F. B. I. investigation upon young persons in the Science Foundation program, for no apparently justifiable reasons of security, would lead to similar restrictions in other areas of education and science with further contravention of our traditional freedom of thought and action."

The letter also stated that the Council fully agrees that investigations and security clearances are necessary in classified fields.

Enclosed with the letter was a broad statement of general principles. The Council it said is "gravely disturbed" to see that "security measures are being extended widely over the scientific life of the country, even in those areas remote from possible military application. This development," the Council's statement continued, "will defeat the growth of science by inhibiting the free exchange of information so vital to it, by discouraging the bravest and most original minds, and by the pervasive threat of irreparable injury to individuals inherent in all counter-intelligence measures."

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GENERAL SCIENCE

From the Winners' Essays

Sternberg Writes

"When I first learned about the new technique for research in nuclear physics—the technique utilizing photographic emulsions to record the tracks of charged particles, I was immediately attracted to it, for this method of research combined three of my most vital interests—photography, microscopy, and physics. I decided to investigate a specific nuclear reaction with the aid of Nuclear Research Plates.

"Basically, my work consisted of obtaining two values for the energy of a certain particle released in the reaction—one from my own experimentation, the other from certain accepted principles (including the much popularized $E=Mc^2$) and comparing the two results.

"If we assume that the physical principles used in the theoretical derivation are correct ones, then my experimental procedure was valid. If we assume that my experimental procedure was valid, then the success of the experiment has added another bit to the great mass of evidence supporting the theory of relativity.

"The results of this study, however, imply more than the pat statement above. Observed track lengths varied. After investigating all the possible reasons (presented in Appendix E) for deviations from the agreeing mean, I was unable, even on the basis of the maximum possible deviation, to explain this wide variation in track lengths.

"Thus, one problem has led to another more intricate one which cries for solution. Perhaps, after I shall have delved more deeply into modern physics, it will yield its solution to me. Perhaps it, too, will lead to other problems, seemingly enigmatic, but inevitably to be solved by the advancing tide of an ever-growing science."—From the essay of Saul Sternberg.

McCormick Writes

"I ran some comparative quantitative analyses with some common stem galls from goldenrod (the Eurosta and Gnorimoschema) and the Large Oak Apple. From these tests I found that the tannin content of goldenrod stem galls is quite low as compared with that of the Large Oak Apple; thus, these stem galls have little or no commercial value.

"While many galls do a great deal of damage to valuable plants and crops, others are almost indispensable to mankind. From various gall nuts, we obtain tannins (glucosides of tannic acid) which are used in tanning leather, making ink, as mordants in dyeing, as medicinal astringents, and many other important ways.

"Recently galls, particularly crown gall tumors caused by bacterium tumerfaciens, have been shown to be a definite type of plant cancer; thus, it is my hope that by continued research and work on these neoplastic conditions, I may do some small bit to aid in the conquest of cancer."—From the essay of Donald McCormick.

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➤

***HOBBY SHOW ATTRACTIONS**—Left to right: Saul Sternberg exhibits track-length measurements of nuclear emulsions; Donald McCormick, plant cancers; David Lubell, a theorem in projective geometry; Victor Rosen, Jr., hypertension in the rat and the nervous system of a cat; Sol Krongelb, a public address system; Donn Martin, determination of the ideal concentrations of chemicals in obtaining rapid hydrogen production; Cynthia Wyeth, a sensitive magnetometer; Alice McKinney, the neutralizing effect of chemicals on alkaline soils to permit crop growth; John Rippon, control of the Colorado potato beetle; Dennis Malone and Robert Detenbeck inspect Dennis' Van de Graaff generator; Lenore Taylor, mutations of the fruit fly from X-radiation; Stanley Koreman, survey on the effect of comic books on school children.*

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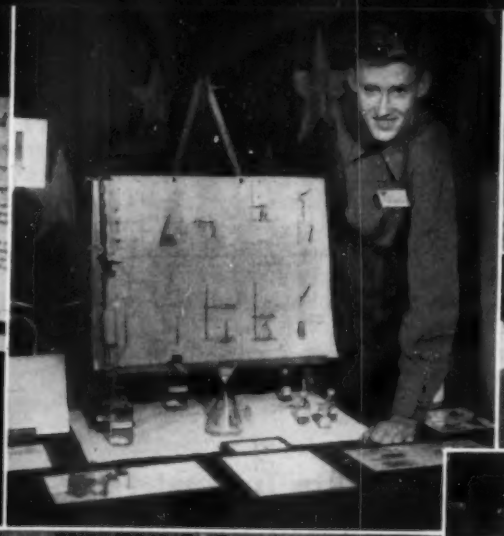
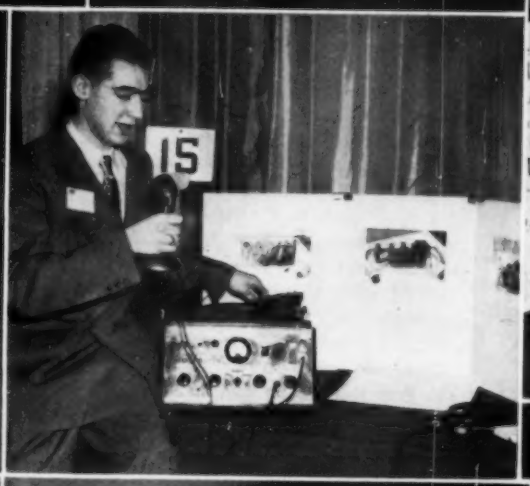
So What

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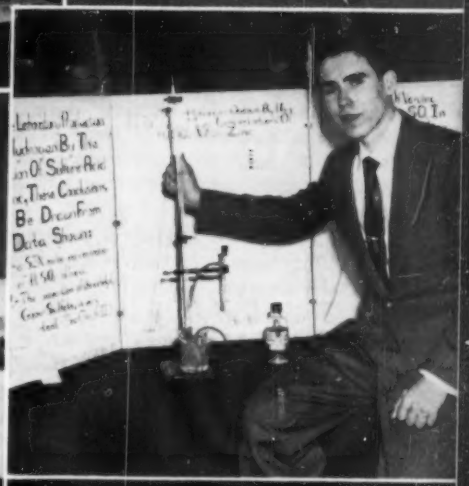

ALKALINE SOILS ARE
UNPRODUCTIVE WASTELANDS.

Are they HARMFUL

PSYCHIATRY

Psychiatrists Warn Vet Mental Care Endangered

➤ DECLARING that "medical care of nervous and mentally disabled veterans will deteriorate below accepted adequate standards" if the dismissal of 7,100 Veterans Administration employees goes through, the nation's psychiatrists called upon Congress to stop this action.

President George S. Stevenson of the American Psychiatric Association said that the "reduction in personnel will result in immediate deterioration of medical care to veterans and discourage remaining personnel in performance of their duties. This kind of false economy," he went on "always results in less effective treatment which ultimately means greater expense to the taxpayer."

The 7100 V. A. employees have received notice of their dismissal. Only Congress can take action to stop it.

The statement, approved by the Council of the Association, pointed out that government procedure prevents V. A. officials from telling Congressmen directly of what Dr. Stevenson called the "disastrous results which will follow" the dismissal action.

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ZOOLOGY

Hungry Predators To Take Heavy Livestock Toll

➤ HUNGRY coyotes, wolves and mountain lions will take a heavy toll of Western livestock this spring.

This is the bad side of an unusually mild winter, the Government official who leads a running war with such marauders declared. He is Door D. Green, Chief of the Branch of Predator and Rodent Control of the U. S. Fish and Wildlife Service.

Much less snow fell on the Great Plains this year than in last winter's great blizzards. Few dead animals are now on the ranges. Predators are facing hard times, since last year they fared well and increased in number, while breeding stocks of deer, sage grouse and pheasant were severely reduced.

Mr. Green said the spring calving and lambing season—late April to early June—is the most dangerous period, since predators themselves are denning. They have extra mouths to feed.

With practically no free meat provided by snow or cold, prowlers must turn to wild prey and then to domestic animals—particularly the young, which are easily killed.

The Wildlife Service has its own ways of meeting the attacks. One is the "coyote-getter."

This device, scented with fatted meat, explodes a charge of cyanide into a coyote's mouth when he bites on it. Other animals are not attracted by it, Mr. Green said.

Last year alone, 38,949 coyotes were "got" by the getter—nearly half of the Wildlife Service's official count of 85,489 predators killed and scalped or skinned for the record.

Predators are fought also by den hunting with dogs, shooting, trapping and poisoning. "But there are still plenty on the loose," Mr. Green added.

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WILDLIFE

Rare Trumpeter Swan Desert Their Home

➤ THE rare trumpeter swan have sprung a surprise and added a mystery. This winter they have deserted their home at the waterfowl refuge, Red Rock Refuge, Mont. This bird refuge is carefully guarded by the U. S. Fish and Wildlife Service.

According to Kenneth F. Roahen, U. S. Game Management Agent, Billings, this is the first time, to his knowledge, that no swan have spent the winter at Red Rock Lakes.

The trumpeters are not migratory waterfowl and spend the whole year in the north.

Red Rock Reservation, just west of Yellowstone Park, is one of the few remaining sites for these elusive and majestic all-white birds. Last August in Yellowstone Park and immediate vicinity the greatest number of trumpeters ever recorded—90—were counted in the annual swan census.

The whereabouts of the swan which have deserted this reservation is not known.

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ASTRONOMY

No Trace Found of Early Stage of New Star

➤ MORE than 300 Harvard photographs taken since 1892 have been searched and no postive trace of the star that blazed forth as the nearly naked eye nova Lacertae in February has been found.

Usually when a great stellar explosion does occur a very faint star is found on earlier plates that matches with the new star. The search by Dr. Dorrit Hoffleit of Harvard Observatory did show a very faint star on 11 plates that may possibly be the pre-nova star, but the photographic image of the nova taken early in February by Vainu Bappu, graduate student, is so large that astronomers can not be sure that the faint star is in the proper position.

The nova continues to remain quite bright, as American Association of Variable Star Observers reports show it was 7.2 magnitude on Feb. 20, which is half a magnitude brighter than on the two preceding nights.

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IN SCIENCE

MEDICINE

Anti-Acne Ointment Found Helpful in 100% of Cases

➤ GOOD results in 100 cases treated with a cosmetically attractive anti-acne ointment are reported by Dr. Helen Dexter of the University of Cincinnati College of Medicine in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (March) in Chicago, Ill.

The ointment, called acnomel, is a flesh-tinted, nongreasy preparation containing resorcinol, sulfur and alcohol. Dr. Dexter's patients were instructed to apply this each morning and evening after twice lathering the skin with soap and hot water and then rinsing with cold water.

Of the 100 patients following this treatment scheme, 45 had their acne completely arrested, 38 were decidedly improved and 17 were improved, Dr. Dexter reports.

In addition, the patients were instructed to omit chocolate and cola drinks from their diet and to cut down on nuts and heavily fried foods. They were "warned emphatically" to keep their hands away from their faces.

"Mere inspection of an acne patient," Dr. Dexter points out, "reveals his usual posture. The acne will be most pronounced where the hand touches the skin."

This is probably because the heat of the hand increases the fatty secretion, thus aggravating the acne. Contact of fingers with face also leads patients to injure the already existing bumps and spots, making them worse.

Emotional tension also plays a part in acne and may need special consideration.

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AGRICULTURE

Cotton Color Now Measured Automatically

➤ AN INSTRUMENT that can determine automatically the exact color of cotton is now being manufactured.

The exact color is needed to assign the cotton to the proper grade. The electronic machine to do this job was developed by Dorothy Nickerson of the Department of Agriculture and Marshall G. Powell and Richard S. Hunter of the Henry A. Gardner Laboratory in Bethesda, Md.

Called the Nickerson-Hunter Cotton Colorimeter, the instrument is expected to improve considerably the accuracy of cotton classing. After the color of the cotton has been measured automatically, the cotton is classed according to grade.

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E FIELDS

GENERAL SCIENCE

Top Japanese Scientists Visit United States

➤ JAPAN'S top scientists are in the United States to make contact with the American scientific scene for the newly-elected Science Council of Japan.

The delegation consists of Dr. Naoto Kameyama, president, Dr. Sakae Wagatsuma, vice-president, and Dr. Yoshio Nishina, all members of the council. They met American scientists for the first time at a Science Service reception for the winners of the Science Talent Search.

The new Japanese science council is unique among such national organizations because it is elected by vote of all the scientists. It was created upon the advice of an American mission to Japan last year.

Dr. Kameyama is an engineer, Dr. Wagatsuma is a lawyer and social scientist and Dr. Nishina is an electronics expert.

Science News Letter, March 18, 1950

MEDICINE

Joint Pain of Arthritis Relieved by Chemical

➤ RELIEF of joint pain in rheumatoid arthritis can be achieved, usually within an hour, by a chemical known as T.E.A.B.

Discovery of this action of the chemical was made by Dr. Trevor H. Howell of St. John's Hospital and Bermondsey Mission Hospital in London.

The initials T.E.A.B. stand for tetraethylammonium bromide. The pain relief it brings lasts from five to 210 days in different patients, Dr. Howell found.

He has given the drug 55 times to 26 patients, he reports in the LANCET, medical journal published in London. Nineteen of the patients got relief from their pain. Three got no relief the first time but were helped the second and third times the drug was given.

The seven patients who did not get relief from the drug were the ones in whom the arthritis did not seem to be active.

Dr. Howell tried this chemical because it is known to block impulses of the autonomic nervous system and the nerve supply of the joints and ligaments is said to be derived from part of this system.

The first patient treated was an elderly man with a flare-up of rheumatoid arthritis in his hands. A small amount of T.E.A.B. solution was given by hypodermic injection and within an hour the pain had left. He had no more pain for three months. The next acute attack was treated the same way with the same results. The man has now been free from pain and swelling for five months.

This "dramatic result" led Dr. Howell to try the drug in three more men and 23 women with acute rheumatoid arthritis. He suggests that while ACTH and cortisone offer hope for arthritics in the future, T.E.A.B. may be added to other methods for relieving the pain in arthritis.

Science News Letter, March 18, 1950

MEDICINE

Licorice in Woman's Remedy Has Female Hormone Action

➤ A REMEDY sold at drug stores and used each month by thousands of women for so-called female troubles now turns out to have real estrogenic (female hormone) action. It owes this, at least in part, to the licorice used to flavor the remedy.

Discovery of the female hormone action of licorice is reported by Dr. Christopher H. Costello, of Columbus, Ohio, and Dr. E. V. Lynn of the Massachusetts College of Pharmacy, to the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION (March) in Washington.

Three other plant extracts which are ingredients of the remedy also contain some estrogenic material. These three are asclepias, helonias and aletris. But the licorice, known medically as glycyrrhiza, contains significant amounts of it.

These and other plant sources of the female hormone or related chemical might furnish a cheaper source of the material than the ones now used in medicine, Dr. Costello and Dr. Lynn point out. They have worked out a method for practical isolation of the material from licorice.

Science News Letter, March 18, 1950

INVENTION

No Sleep Interruption With Automatic Window

➤ WINDOWS will close automatically when it begins to rain and open again after the rain by means of an improved device patented recently. Electric power and weather-affected controls do the job. The windows open only if the temperature outside is sufficiently high.

An electric motor is connected to a drum upon which upper and lower window sash cords are oppositely wound. A switch controlled by a thermostat sets the motor in operation with temperature changes as desired. Associated with the thermostatic switches is a bellows acted upon by precipitation to cause the motor to close the window.

In spite of these automatic attachments, the window can be raised or lowered manually at any time. The inventor is Von L. Vancil, Freeport, Texas. The patent number is 2,499,544.

Science News Letter, March 18, 1950

GEOLOGY

Crude Oil, Gas Reserves For Many Years to Come

➤ NEW finds of underground oil and natural gas during 1949 indicate that there is no immediate danger of a shortage of either liquid or gaseous fuels.

Proved reserves of crude oil and natural gas have reached new all-time peaks, the American Petroleum Institute and the American Gas Association revealed in New York in a joint report. The conclusion is based on findings of near-record breaking explorations made during 1949.

Proved reserves are the underground supplies which the oil and gas industry can draw upon for consumption. They are the reserves whose locations and extent have been proved and measured by drilling. Probable deposits of oil and gas can be determined by various scientific means. It is only by drilling that they can be "proved."

Proved reserves of petroleum and natural gas liquids were estimated at 28.3 billion barrels at the close of 1949. This is an increase of 1.5 billion barrels over the preceding year's total of 26.8 billion barrels. Natural gas liquids include condensates, natural gasoline and liquified petroleum gases.

Proved reserves of natural gas were estimated at 180 trillion cubic feet. This is an increase of 6.5 trillion cubic feet over 1948's year-end total.

How many years would be required to exhaust these known reserves is a question. Dividing the reserves by the current rate of production gives an incorrect conclusion. Oil can not be produced from the permeable rocks in which it occurs at any desired rate, the report emphasizes. The rate of flow of oil through the pores of the oil-bearing rocks is indefinitely controlled by the physical factors of the reservoir.

As a matter of fact, today's known oil can be recovered only over a period of years and at gradually declining annual rates. This has been demonstrated by past performance under all kinds of operating conditions.

Science News Letter, March 18, 1950

GENERAL SCIENCE

Soviet Prizes One-Third U. S. Foundation Allotment

➤ DURING the week the House of Representatives slapped a $15,000,000 annual ceiling on funds the government could spend on basic research through the proposed National Science Foundation, the Soviet government handed out over $5,000,000 or more than one third that amount in awards to scientists alone.

Not only is Congress considering putting a ceiling of $15,000,000 on basic research, it also has no prize fund for scientific research.

Science News Letter, March 18, 1950

GENERAL SCIENCE

Encouragement of Science

Our political life can learn from the spirit of science the need for open-mindedness, persistent freedom of inquiry and resistance to dogma.

By J. ROBERT OPPENHEIMER

Director, Institute for Advanced Study, Princeton, New Jersey

Address delivered at the Awards Banquet of the Science Talent Institute in Washington, D. C., March 6.

➤ WE are here tonight to honor you and to celebrate the high promise of your future as scientists. We are happy to be with you. We think of that future with respect and curiosity. We think of the discoveries which you will make. We think of the questions to which we today have no answer, and to which you will come to know an answer. Even more, we think of the answers that we have today, and of the new questions that you will put to those answers. We think of how altered and how deepened our knowledge of the world will be before you are through with it. My first wish to you is that you may make and that you may share in the making of great and beautiful discoveries which enrich our knowledge of the world of nature and of man. I have a second wish for you; but that must come at the end of my talk.

I do not propose to talk to you of such topics of the day as the hydrogen bomb and the statutory provisions of the National Science Foundation. If these matters are not in a very different state when you shall have come to assume the full responsibilities of citizenship, you will have reason to reproach your elders for your inheritance.

Improved Material World

Science has profoundly altered the conditions of man's life. During the last centuries, the discoveries in science, and their applications to practice, have changed the material conditions of life. They have changed as well many matters of the spirit. They have changed the form in which practical problems of right and wrong come before us; they have changed the focus of moral issues, both for the individual and for governments. They have given us new methods for defining the meaning of problems that face us, and for judging whether or not our solutions are just.

The most manifest of the changes are the material ones. Yet even here it takes a certain perspective to see their true extent. Advances in the study of man and other living forms have extended our life-span by decades. Discoveries in physical science have immeasurably lightened our toil, and enriched our lives. They have given leisure to an ever-widening group of men. They have made a reasonable education not a special privilege, but a common right. They have made the world, in its physical dimensions, a small place, and established the means by which people in remote parts of the earth can communicate with each other, can get to know each other, and can learn to work together. They have put at the disposal of everyone the resources of physical power, of ease and of knowledge that were in the past reserved for the few.

Not all of the changes in material well-being that science offers are realities. Yet the very fact that they are possibilities has changed the nature of the responsibility which we bear, both as individuals and as a community of men and women banded together in government. In the Greek cities, political democracy, and civilization itself, appeared possible only on the basis of a slave economy. Technology, born of science, has altered that; it has enabled mankind, as it has forced mankind, to deal with the issues of slavery as a moral issue. Poverty has always been an ugly thing, and in its extremes a desperate one. Today it is an evil, in the sense that it lies within human hands and human hearts to abate it. Science can provide us, for the first time in history, with the means of abating hunger for everyone on earth.

A New Situation

Perhaps nowhere has the impact of science more clearly altered the specific terms of a great political issue than in the effects of scientific development on warfare. This is a can of worms with which I have myself unhappily been egaged for some years. It would not be honest to say—as it would be folly not to hope—though it would not be foolish to hope—that the very terror of modern weapons would in itself put an end to war; it would even be foolish to say that because of this terror the abolition of war and the maintenance of peace have become the one absolute, final objective of all political decisions. There are other things in man's life, his freedom, his decency, and his sense of right and wrong, that cannot so lightly be subjected to a single end. But what we need to remember is that war today has become, and is increasingly becoming, something very different from what it was a century ago or a millenium ago. We need to recognize the new situation as new; we need to come to it with something of the same spirit as the scientist's, when he has conducted an experiment and finds that the results are totally other than those that he had anticipated.

Four months before Hiroshima, in the last days of his life, President Roosevelt's thoughts turned to these questions. In the last words that he wrote, in words he did not live to speak, the President looked to the future, to the atomic age. He looked to the past, to the days of the founding of the Republic. He wrote:

"Thomas Jefferson, himself a distinguished scientist, once spoke of the 'brotherly spirit of science, which unites into one family all its votaries of whatever grade, and however widely dispersed throughout the different quarters of the globe.'

"Today science has brought all the different quarters of the globe so close together that it is impossible to isolate them one from another.

"Today we are faced with the preeminent fact that, if civilization is to survive, we must cultivate the science of human relationships—the ability of all peoples, of all kinds, to live together and work together, in the same world, at peace."

Science has greatly extended the range of questions in which man has a choice; it has extended man's freedom to make significant decisions. Is there anything in the methods of science itself, or in the spirit of science, which can help in the making of these decisions? To what extent is there a play on the word *science* which can mislead us and take us up false roads when we speak of this science of human relationships? Is there anything we can learn from the relevance of science to politics?

Science, Practical Problems Differ

If we are to answer these questions, and answer them honestly, we must recognize important and basic differences between problems of science, and problems of action, as they arise in personal or in political life. If we fail to recognize these differences, we shall be seeking magic solutions and not real ones. We shall delude ourselves into laying aside responsibility, which it is an essential part of man's life to bear.

In most scientific study, questions of good and evil, or right and wrong, play at most a minor and secondary part. For practical decisions of policy, they are basic. Without them political action would be meaningless. Practical decisions, and above all, political decisions can never quite be freed from the conflicting claims of special interest. These too are part of the meaning of a decision and of a course of action, and they must be an essential part of the force of its implementation.

Political decisions are unique acts. In politics there is little that can correspond to the scientist's repetition of an experiment. An experiment that fails in its purpose may be as good or better than one that succeeds, because it may well be more instructive. A political decision cannot be taken twice. All the factors that are relevant to it will conjoin only once. The analogies

of history can provide a guide, but only a very partial one.

These are formidable differences between the problems of science and those of practice. They show that the method of science cannot be directly adopted to the solution of problems in politics and in man's spiritual life. Yet there is relevance of a more subtle, but by no means trivial kind.

In trying more fully to explore this relevance, I should like to start with a text. This text is a letter* written by Thomas Jefferson to a young man who had enquired of him as to the usefulness of his studies of science. It was written in the middle of the year 1799, the year in which Napoleon abolished the Directory and began to assume dictatorial power in France, the year before Thomas Jefferson was elected for the first time as President of the United States. Jefferson and the diverse brave and hopeful men who with him laid the foundations of our own government had learned much from the peoples of other nations. Many of their highest political ideals and their most powerful political instruments were built on the experience, the insight and wisdom of European scientists and philosophers. Even today we need to remember that this was so, and that there may be much that we can learn from others, and that we should be glad to learn, as in turn by example, we should be glad to teach.

Jefferson's letter starts with a survey of the subjects in science which he believes young Munford ought to pursue. I will quote one characteristic passage which may strike a familiar and homely note for you:

"The science of calculation also is indispensible as far as the extraction of the square and cube roots; Algebra as far as the quadratic equation and the use of logarithms are often of value in ordinary cases: but all beyond these is but a luxury; a delicious luxury indeed; but not to be indulged in by one who is to have a profession to follow for his subsistence."

Thomas Jefferson's Words

But that is not really the part of Jefferson's letter which I commend to you. Here it is:

"I am among those who think well of the human character generally. I consider man as formed for society, and endowed by nature with those dispositions which fit him for society. I believe also, with Condorcet, as mentioned in your letter, that his mind is perfectible to a degree of which we cannot as yet form any conception. It is impossible for a man who takes a survey of what is already known, not to see what an immensity in every branch of science yet remains to be discovered, and that too of articles to which our faculties seem adequate."

*I am indebted to Dr. Julian Boyd of Princeton University for the copy of this hitherto unpublished letter.

And later, in the same letter, still more explicitly:

". . . and it is still more certain that in the other branches of science, great fields are yet to be explored to which our faculties are equal, and that to an extent of which we cannot fix the limits. I join you therefore in branding as cowardly the idea that the human mind is incapable of further advances. This is precisely the doctrine which the present despots of the earth are inculcating, and their friends here re-echoing; and applying especially to religion and politics; 'that it is not probable that any thing better will be discovered than what was known to our fathers.' We are to look backwards then and not forwards for the improvement of science, and to find it amidst feudal barbarisms and the fires of Spital-fields. But thank heaven the American mind is already too much opened, to listen to these impostures; and while the art of printing is left to us, science can never be retrograde; what is once acquired of real knowledge can never be lost. To preserve the freedom of the human mind then and freedom of the press, every spirit should be ready to devote itself to martyrdom; for as long as we may think as we will, and speak as we think, the condition of man will proceed in improvement. The generation which is going off the stage has deserved well of mankind for the struggles it has made, and for having arrested that course of despotism which had overwhelmed the world for thousands and thousands of years. If there seems to be danger that the ground they have gained will be lost again, that danger comes from the generation your cotemporary. But that the enthusiasm which characterises youth should lift it's parracide hands against freedom and science would be such a monstrous phaenomenon as I cannot place among possible things in this age and this country."

To me there are two striking impressions which this letter of Jefferson's makes, even beyond its eloquence and its beauty. The first is that the letter is suffused with the idea of progress, that ideal that owes so much to the development of science and that in turn has provided the great enriching human faith in which scientific discovery and invention has flourished. Jefferson is confident that an increased understanding of the world will lead to progress; he is convinced that the barbarisms of the past cannot stand up against enquiry and understanding and enlightenment; he is confident in man and sure that as men know more they will act more wisely and live better. In our contemporary expressions of hope that catastrophe could be averted and civilization yet be saved, that confidence has lost much of its robustness.

Relevance of Science to Politics

The second point is that for Jefferson there is something in the ways of science that is relevant to political life. Even in religion and politics, he holds that it is probable that things better will be discovered than what was known to our fathers. This conviction that new knowledge is possible, and that not all the answers are known, is of course the stuff of the day to day life of the scientist. Science itself does progress; new knowledge is possible; and new knowledge, because it does not destroy or ignore the old, can only increase our understanding. The very idea of the development of science is an example of progress, and of progress which in no true sense can ever be reversed. But this is only part of the story. It is true, as Jefferson knew, that in the large, science has flourished in conditions of human freedom, and that its growth is parallel to the growth of democratic institutions. Today, looking back on more than a century and a half of further history, we can be even more sure of this. We have seen not only the inspiriting example of science and democracy flourishing together, but the tragic examples of their foundering together. We express the hope that of this tragedy we shall soon have seen the end.

Freedom of Inquiry

What are these lessons that the spirit of science teaches us for our practical affairs? Basic to them all is that there may be no barriers to freedom of enquiry. Basic to them all is the ideal of open-mindedness with regard to new knowledge, new experi-

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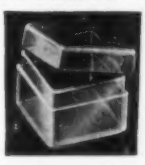

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ence and new truth. Science is not based on authority. It owes its acceptance and its universality to an appeal to intelligible, communicable evidence that any interested man can evaluate.

No Dogma in Science

There is no place for dogma in science. The scientist is free to ask any question, to doubt any assertion, to seek for any evidence, to correct any error. Where science has been used in the past to erect a new dogmatism, that dogmatism has found itself incompatible with the progress of science; and in the end, the dogma has yielded, or science and freedom have perished together.

Our own political life is predicated on openness. We do not believe any group of men adequate enough or wise enough to operate without scrutiny or without criticism. We know that the only way to avoid error is to detect it, that the only way to detect it is to be free to enquire. We know that the wages of secrecy are corruption. We know that in secrecy error, undetected, will flourish and subvert.

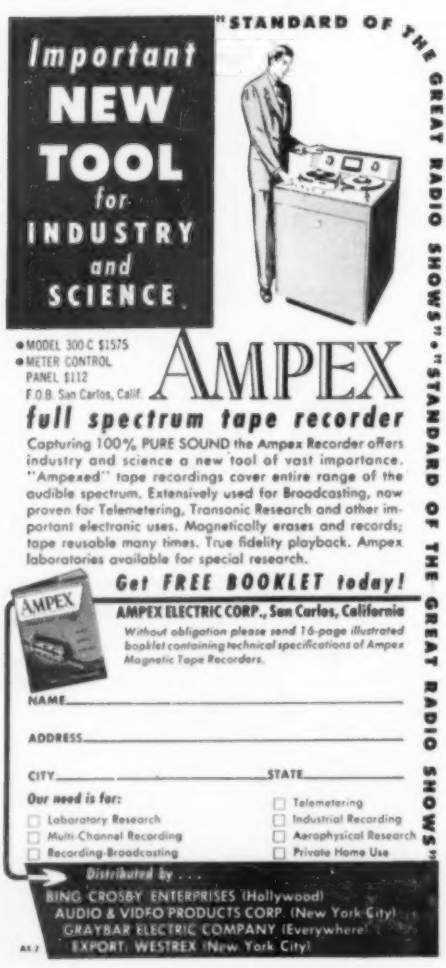
Let me be clear. Science is not skepticism. It is not the practice of science to look for things to doubt. It was not by a deliberate attempt of skepticism that physicists were led to doubt the absolute nature of simultaneity, or to recognize that the ideas of strict causality embodied in classical physics could not be applied in the domain of atomic phenomena. There is probably no group of men who take more for granted in their daily work than the scientists. Common sense, and all that flows from it, are their principal basis for what they do in the laboratory and for what they make of it on paper. But for scientists it is not only honorable to doubt, it is mandatory to do that when there appears to be evidence in support of the doubt. In place of authority in science, we have and we need to have only the consensus of informed opinion, only the guide of example. No scientist needs to order his colleagues to use a new technique of experiment or to enter a new field of discovery. If he has done this, it will be an invitation to his fellows to follow.

These then are some of the attitudes of mind, these are some of the disciplines of spirit which grow naturally in the scientist's world. They have grown there in part as a result of a humane and liberal tradition in political life, and in part as a cause of that. The open mind, the reliance on example and persuasion, rather than on authority, these are the heritage of the centuries in which science has altered the face of the earth. Science can help in diverse ways in preserving and extending this heritage. Its very universality speaks across frontiers to make truth manifest in lands otherwise darkened; its material applications create the preconditions in leisure, in education, in means of communication—for the converse of men with each other. Science provides the material and the intellectual basis for a world in which example and understanding can help all men to improve their lot and fulfill their hopes. Today we need to remember that our country, founded on these practices, and grown strong by their exercise, owes its strength to them. In this time of crisis, we need to cherish that strength.

A World of Confidence

And this brings me to my second wish for you. I wish you not only the joy of great discovery; I wish for you a world of confidence in man and man's humanity, a world of confidence in reason, so that as you work you may be inspired by the hope that what you find will make men freer and better—in which, working as specialists in what may be recondite parts of the intellectual life of the time, you are nevertheless contributing in a direct and basic way to the welfare of mankind.

Science News Letter, March 18, 1950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MINING

Liquid Fuels Produced at Costs Near Petroleum

➤ LIQUID fuels from oil shale and coal can now be produced at costs competitive with petroleum products, the Secretary of the Interior revealed in his annual report to Congress.

Refined products could now be obtained from oil shale at an actual cost averaging 7.3 cents a gallon, and from coal at 10.8 cents a gallon. If produced by a private company, these fuels could have a wholesale price of nine and 14.5 cents a gallon respectively with a sufficient profit margin.

Further reduction in costs is certain as our knowledge is extended, the Secretary said. With emphasis now centered on operation rather than design and construction of laboratories and demonstration plants, the synthetic fuels program has entered its most valuable period and is making rapid strides.

The capital investment now required for a plant producing 10,000 barrels a day of crude shale oil, or 8,840 barrels a day of refined products, is about $41,381,000. This would cover mining, retorting and refining. Diesel oil and fuel for jet planes would be the primary products. Motor gasoline could be produced readily by modification of the refining process.

The estimated capital investment for a modernized coal-hydrogenation plant of 30,000 barrels a day capacity is $246,800,000. High-octane gasoline would be the principal product. Byproducts would include liquified petroleum gases and phenols, for which there is a growing demand.

Operation of a limited number of coal-hydrogenation plants to produce chemicals as a major part of the products may be very attractive, the report states. In addition to phenols, coal-hydrogenation plants can produce important quantities of benzene, toluene, naphthalene and tar bases.

Science News Letter, March 18, 1950

● RADIO

Saturday, March 25, 3:15 p.m., EST

"Adventures in Science" with Watson Davis, director of Science Service over Columbia Broadcasting System.

Dr. John D. Mizelle, Department of Zoology, University of Notre Dame; Dr. Fernandus Payne, Professor of Zoology at Indiana; Dr. Lawrence Baldinger, Dean of College of Science, University of Notre Dame; and Dr. Ralph W. Lefler, Department of Physics, Purdue, will discuss "How Nature Helps Mankind."

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ZOOLOGY

NATURE RAMBLINGS

Spiders

➤ ONE sign of authentic Navajo weaving, it is said, is a hole left in the middle of the blanket or basket. This is in compliance with an ancient compact with the Spider Woman who imposed this condition in return for teaching the Pueblo Indians of the Southwest the arts of spinning.

The ancient Greeks paid tribute to spiders with a legend of their own. A maiden named Arachne was so skillful at the domestic art that she challenged the goddess of weaving, Athena, to a competition. Her handiwork was so excellent that the goddess, in a rage, destroyed the tapestry of her mortal rival, changed Arachne into a spider, and condemned her to an eternity of spinning. Arachne became the Greek word for spider, and scientists still preserve the word in their name, the Arachnids, for the class of creatures to which spiders belong along with scorpions, mites, ticks, and Daddy Longlegs.

People frequently make the mistake—usually accompanied with an "ugh" of revulsion—of grouping spiders with the insects. Spiders are not insects. Insects form a separate class of their own. The spider clan differs in many ways, possibly the most striking being the fact that they have eight legs.

Another interesting difference between spiders and insects is that spiders lack wings. But this lack of "conventional" flying equipment is no serious handicap, because spiders have evolved a method of airborne travel that is as giddy as a roller coaster and as improbable as a magic carpet. It is called ballooning.

Ballooning is an activity which seems to be characteristic of new-born spiders, but it is by no means restricted to them. Provided the spider species is small in size, all age and maturity groups seem to indulge in the sport. The way the game is played is this: A spider will make for the highest available point, for example the pinnacle of a stalk of grass. Then it will face into the wind, pointing its abdomen at a high angle up into the air.

This position, with the rear end tilted up like a cannon, puts the spinnerets into an advantageous position. Silk thread starts from the spinnerets, the passing breeze tugs on the silk, pulling it out. As the thread grows longer, the tug grows stronger, and at a certain point the spider lets go its toe-hold and goes sailing off downwind on its silken filament.

This unlikely aeronautical technique probably accounts for the dispersion of spiders all over the globe. Charles Darwin observed ballooning spiders when his ship, the Beagle, was 60 miles off the South American coast, and they have been reported as far as 200 miles offshore.

One of the requirements for ballooning is lightness of weight. The larger spiders, like the tarantula sketched above, are too bulky for ballooning even when young.

Science News Letter, March 18, 1950

AERONAUTICS

Drastic Cut in Red Tape of International Air Travel

➤ RED tape in travelling from country to country by airplane is now drastically cut. The International Civil Aviation Organization, whose central office is in Montreal, Canada, has revealed that the member nations have agreed to proposals of the central 50-nation group.

It means, officials of ICAO state, that the member nations have agreed to a standardization of customs, immigration and related procedures which will speed the international movement of both passengers and cargo by air.

ICAO's regulations provide for standardized forms for the entry and clearance of aircraft, crews, passengers and cargo. Among these forms is the embarkation-disembarkation card which, in many cases, will eliminate in-transit visa requirements for passengers moving through a country to another destination.

The new regulations also provide for the creation of direct transit zones, which will completely eliminate red tape for passengers staying on the same flight or making direct connections.

Science News Letter, March 18, 1950

ENGINEERING

Sisal By-Product Yields Building Blocks of Soil

➤ AN UNUSED portion of the sisal plant remaining after fibers have been removed for rope making is now yielding a material which makes soil into high-quality building blocks.

This is a development in Africa. An English chemical company has announced plans to erect two factories to produce the soil stabilizing agent in Tanganyika and Kenya, two sisal-growing areas. The story is told in CHEMICAL AND ENGINEERING NEWS, published by the American Chemical Society.

Soil blocks, stabilized with the sisal by-product, can be used in construction in the same way as cement or concrete blocks. Weather-proof and wear qualities of the blocks are satisfactory. Building costs can be cut 40% when stabilized soil blocks are used instead of those made with cement.

Science News Letter, March 18, 1950

Words in Science—FISSION-FUSION

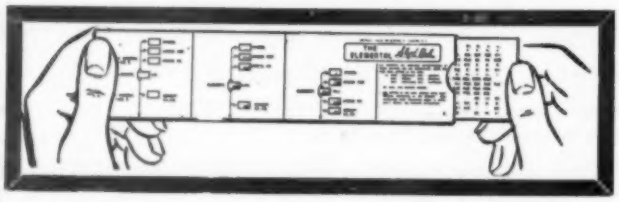
➤ FISSION is defined as the splitting up into parts while fusion means the combining together by heat.

In the atomic bomb process, fission takes place in uranium 235 or plutonium when it is bombarded with neutrons. The atom is split into elements of lesser mass with the conversion of mass into tremendous amounts of energy and deadly radiation that can be so destructive.

In the so-called hydrogen bomb, fusion would take place. That is, triggered by a fission bomb producing extreme temperatures, the light elements would form heavier elements. In the process of this fusion synthesis, mass is also lost and converted into tremendous energy, according to the Einstein mass-energy equivalence.

Science News Letter, March 18, 1950

STUDENTS! A NEW DATA RULE—96 ELEMENTS



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ANALYSIS AND DESIGN OF EXPERIMENTS—H. B. Mann—*Dover,* 198 p., illus., $2.95. Analysis of variance and of variance designs. For the mathematician, the practical experimenter and the statistician.

AN ATLAS OF CAT ANATOMY—Hazel E. Field and Mary E. Taylor—*University of Chicago Press,* 75 p., illus., $3.75. A visual aid for the student which demonstrates clearly the anatomy of the mammal. 57 full-page plates.

AUTHOR'S GUIDE FOR PREPARING MANUSCRIPT AND HANDLING PROOF—*Wiley,* 80 p., illus., $2.00. The publishers have brought forward a booklet to aid the author in efficient preparation of his material, both manuscript and illustrations. Slanted toward the technical manuscript.

BIOLOGICAL CONTROL OF THE EUROPEAN CORN BORER IN THE UNITED STATES—W. A. Baker, W. G. Bradley, and C. A. Clark—*Gov't. Printing Office,* U. S. Dept. of Ag. Tech. Bull. No. 983, 185 p., illus., paper, 50 cents. A technical report.

CONSERVATION METHODS IN COTTON PRODUCTION—B. H. Hendrickson—*Gov't. Printing Office,* U. S. Dept. of Ag. Misc. Publ. No. 694, 32 p., illus., paper, 10 cents.

DISSOCIATION ENERGIES AND SPECTRA OF DIATOMIC MOLECULES—A. G. Gaydon—*Dover,* 239 p., illus., $3.95. The author records and analyzes the results of recent research in the field.

FEDERAL-STATE-LOCAL RELATIONS IN AGRICULTURE—John D. Black—National Planning Association, Pamphlet No. 70, 46 p., paper, 50 cents. The author's views on federal, state and local administration of farm programs.

THE FORMS OF THE BLACK HAWK-EAGLE—Herbert Friedmann—*Smithsonian Institution,* Vol. III, No. 16, 4 p., illus., paper, 10 cents. A record of the finding of two separable units of the species, black hawk-eagle.

FUNDAMENTAL EDUCATION: A Descrpition and Programme—*UNESCO* (U. S. Distributors: *Columbia University Press*), 84 p., illus., paper, 25 cents. First of a series of booklets on fundamental education to be put out by UNESCO.

HANDLING, STORAGE, TRANSPORTATION, AND UTILIZATION OF POTATOES: A Digest of Information on the Subject Published Mostly from 1938 to 1948—Dean H. Rose and Harold T. Cook—*Gov't. Printing Office,* U. S. Dept. of Ag. Bibl. Bull. No. 11, 163 p., paper, 35 cents.

HOME FREEZING FOR EVERYONE: Recipes, Menus, Methods—Lura Jim Alkire and Stanley Schuler—*M. Barrows,* 157 p., $2.00. General all-around information on the subject.

HOW TO KNOW THE WILD FLOWERS—Alfred Stefferud—*Holt,* 144 p., illus., $2.00. A handy little guide for when you go looking for wild flowers in the woods.

LET'S LOOK UNDER THE CITY: Water, Gas, Waste, Electricity, and Telephone—Herman and Nina Schneider—*William R. Scott,* approx. 35 p., illus., paper, $1.50. A children's book explaining several utilities of a city. Informative illustrations.

LUMBER DRY KILNS AND THEIR OPERATION—A. J. Panshin—*Michigan State College,* 70 p., illus., paper, free upon request to publisher, Agricultural Experiment Station, Section of Forestry, East Lansing, Mich. A bulletin describing the fundamental operations and uses of the kiln.

MAQUOKETA BRACHIOPODA OF IOWA—Y. Wang—*Geological Society of America,* Memoir 42, 55 p., $1.40. A study which describes and discusses 22 genera and 60 species of brachiopods.

1950 TELEVISION SERVICING INFORMATION—M. N. Beitman, Compiler—*Supreme Publications,* 144 p., illus., paper, $3.00. This year's manual includes more models than ever before and also presents more servicing instruction.

PHENOMENA, ATOMS AND MOLECULES: An Attempt to Interpret Phenomena in Terms of Mechanisms or Atomic and Molecular Interactions—Irving Langmuir—*Philosophical Library,* 436 p., illus., $10.00. A collection of 20 papers which the author has written since 1909.

THE ROLL CALL OF THE IROQUOIS CHIEFS: A Study of a Mnemonic Cane from the Six Nations Reserve—William N. Fenton—*Smithsonian Institution,* Publ. No. 3995, 73 p., illus., paper, 75 cents. A monograph of a particular Iroquois Chiefs' cane. With 12 plates.

SCIENCE VIA TELEVISION—Lynn Poole—*Johns Hopkins Press,* 198 p., illus., $3.50. The author tells how to plan, write, and produce a television program.

SOCIAL ANTHROPOLOGY: The Science of Human Society and Culture—J. S. Slotkin—*Macmillan,* 604 p., $4.75. An introductory text.

SRA YOUTH INVENTORY—H. H. Remmers and Benjamin Shimberg—*Science Research Associates,* 11 p., paper, 75 cents for a specimen set either hand or machine-scored. A check list of 298 questions designed as a tool to help teachers, counselors, and school administrators to identify quickly the problems that young people say worry them most.

THE STANDARD BOOK OF HUNTING AND SHOOTING—Robert B. Stringfellow, Ed.—*Greystone,* 564 p., illus., $5.95. A guide to game hunting on the North American continent. Many helpful illustrations. Abridged from *The Hunter's Encyclopedia.*

THE STORY OF THE AMERICAN AUTOMOBILE: Highlights and Sidelights—Rudolph E. Anderson—*Public Affairs Press,* 301 p., illus., $3.75. The history of the American automobile as the author sees it. Many amusing illustrations.

STUDY ABROAD: International Handbook—Fellowships, Scholarships, and Educational Exchange, Vol. II—*UNESCO* (U. S. Distributors: *Columbia University Press*), 362 p., illus., paper, $1.25. A compilation of the available international higher education.

SURFACE-ACTIVE QUATERNARY AMMONIUM GERMICIDES—Carl A. Lawrence—*Academic Press,* 245 p., illus., $6.00. A monograph compiling a review of the literature in this field.

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Science News Letter, March 18, 1950

SELF-LUBRICATING SKI has a plastic bottom bonded to natural hickory. The plastic is made of layers of cloth saturated with a synthetic resin and pressed under heat. This particular plastic is lubricated by water, which means the ski itself is self-lubricated by its contact with snow.

Science News Letter, March 18, 1950

THREE-IN-ONE SHAVING set is a single unit with shaving powder container, a brush and a safety razor blade holder. Its cylindrical powder holder is the handle and from it powder may be forced into the brush. The razor is positioned in one of the six edges of the container's cap.

Science News Letter, March 18, 1950

RADIO TRANSMITTER-RECEIVER, developed by the U. S. Air Force and shown in the picture, is for ditched airplane crews in life boats or belts in the ocean. It is able to transmit and receive both voice and code signals, and has a pick-up range of 80 miles. Instrument and battery are unaffected by salt water.

Science News Letter, March 18, 1950

LABORATORY PIPETTE, for use in delivering small measured quantities of liquids used routinely, will dispense any volume up to two milliliters merely by operating a plunger. A vernier control regulates stroke of the plunger to deliver an exact volume.

Science News Letter, March 18, 1950

ADHESIVE WETTER, for use when envelopes are ready for sealing, consists of a water-holding tube, like a pencil held between the thumb and forefinger, which has a sponge rubber roller at its lower end. A slight squeeze of the tube starts an even, smooth flow of water.

Science News Letter, March 18, 1950

ROLL-UP DEVICE, to force toothpaste from the tube without the customary squeezing, is a small plastic cylinder with a split up its center. The end of the tube is inserted in the split. Then the "roll-up" is rotated as much as is needed by means of a tiny handle.

Science News Letter, March 18, 1950

MULTIPLIER PHOTOTUBE is an improved photoelectric "eye" capable of picking up the feeblest illumination and converting it into electrical current. It can amplify the current as much as several million times, it is claimed. Uses range from work in astronomy to nuclear research.

Science News Letter, March 18, 1950

Do You Know?

Boston is the chief port handling *lobsters.*

Small *magnesium plates* hung around the hull of a steel ship greatly lessens damage to the steel by corrosion.

Rollers for applying paint to flat surfaces are replacing paint brushes to an increasing extent.

More than 97% of the men *wounded* in the recent war survived; resources of blood and plasma played a big part in the life-saving.

By reacting chemically the camphene obtained from turpentine with chlorine, a new substance, called *toxaphene,* is produced; it is a promising agent for a wide range of insecticides.

In order to avoid confusion due to years, astronomers use what is called the Julian Day *Calender;* it is simply a count of the total number of days since the beginning of the year 4713, B.C.

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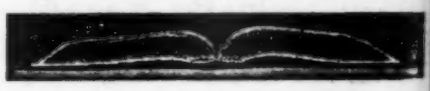

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